

What is claimed is:

1. An inductive head comprising a lower magnetic core formed on a substrate, a magnetic pole tip layer formed on the lower magnetic core, an upper magnetic core coupled in its front end to the magnetic pole tip layer, coupled in its rear end to the lower magnetic core, having a width of the front end smaller than that of the rear end, and having at least partially a shape gradually reducing the width from the rear end to the front end, coils disposed around between the upper magnetic core and the lower magnetic core, and an insulating layer formed between the coils and the upper magnetic core or the lower magnetic core, wherein the distance between the top surface of the magnetic pole tip layer and the lower magnetic core in a rear end region away from an air bearing surface in a region connecting the magnetic pole tip layer to said upper magnetic core is shorter than the distance between the top surface of said magnetic pole tip layer in the air bearing surface and said lower magnetic core.

2. The inductive head according to claim 1, comprising a magnetic gap layer formed at least near the air bearing surface on said lower magnetic core, a non-magnetic layer for maintaining a thickness increased with moving away from the air bearing surface, in a region such that the magnetic gap layer is moved away from the air bearing surface, or in a region such that the magnetic gap layer is moved away from the air

bearing surface and in a region such that the lower core is moved away from the air bearing surface, and said magnetic pole tip layer formed on the magnetic gap layer and the non-magnetic layer.

5       3. An inductive head comprising a lower magnetic core formed on a substrate, a magnetic pole tip layer formed on the lower magnetic core, an upper magnetic core coupled in its front end to the magnetic pole end layer, coupled in its rear end to the lower magnetic  
10      core, having a width of the front end smaller than that of the rear end, and having at least partially a shape gradually reducing the width from the rear end to the front end, coils disposed around between the upper magnetic core and the lower magnetic core, and an  
15      insulating layer formed between the coils and the upper magnetic core or the lower magnetic core, wherein the distance between the top surface of the upper magnetic core and the lower magnetic core in a rear end region away from a air bearing surface in a region connecting  
20      the magnetic pole tip layer to said upper magnetic core is shorter than the distance between the top surface of said magnetic pole tip layer in the air bearing surface and said lower magnetic core.

4. The inductive head according to claim 3,  
25      comprising a magnetic gap layer formed at least near the air bearing surface on said lower magnetic core, a non-magnetic layer formed in a region such that at least the magnetic gap layer is moved away from the air

bearing surface and having a portion for maintaining a thickness increased with moving away from the air bearing surface, and said magnetic pole tip layer formed on the magnetic gap layer and the non-magnetic layer.

5

5. The inductive head according to claim 2, wherein said magnetic pole tip layer is formed on the lower magnetic core near the air bearing surface, and is formed on the non-magnetic layer formed on the lower 10 magnetic core in the region away from the air bearing surface.

10

6. The inductive head according to claim 4, wherein said magnetic pole tip layer is formed on the lower magnetic core near the air bearing surface, and 15 is formed on the non-magnetic layer formed on the lower magnetic core in the region away from the air bearing surface.

15

7. The inductive head according to claim 1, wherein said magnetic pole tip layer comprises three 20 layers of magnetic layer/non-magnetic layer/magnetic layer.

20

8. The inductive head according to claim 3, wherein said magnetic pole tip layer comprises three 25 layers of magnetic layer/non-magnetic layer/magnetic layer.

25

9. The inductive head according to claim 5, wherein said magnetic pole tip layer comprises three layers of magnetic layer/non-magnetic layer/magnetic

layer.

10. The inductive head according to claim 6,  
wherein said magnetic pole tip layer comprises three  
layers of magnetic layer/non-magnetic layer/magnetic  
layer.

11. The inductive head according to claim 1,  
wherein the front end of said upper magnetic core is  
recessed from the air bearing surface by 0.2 to 3.0  $\mu\text{m}$ .

12. The inductive head according to claim 3,  
10 wherein the front end of said upper magnetic core is  
recessed from the air bearing lifting surface by 0.2 to  
3.0  $\mu\text{m}$ .

13. The inductive head according to claim 1,  
wherein the saturation magnetic flux density of the  
15 magnetic pole tip layer is higher than that of any one  
of at least the upper magnetic core and the lower  
magnetic core.

14. The inductive head according to claim 3,  
wherein the saturation magnetic flux density of the  
20 magnetic pole tip layer is higher than that of any one  
of at least the upper magnetic core and the lower  
magnetic core.

15. A magnetic disk apparatus comprising a  
magnetic recording media, a motor driving the same, a  
25 magnetic head for read and write onto the magnetic  
recording media, and a mechanism for positioning the  
magnetic head, wherein at least one inductive head  
according to claim 1 is mounted as the write head, a

width of the magnetic pole tip layer of said head in  
the air bearing flying surface is not more than  $0.5 \mu\text{m}$ ,  
the saturation magnetic flux density of the magnetic  
layer consisting of the magnetic pole layer is not less  
than  $1.6\text{T}$ , and the coercivity of the magnetic recording  
media is  $317$  to  $634 \text{ kA/m}$  ( $4.0$  to  $8.0 \text{ kOe}$ ).  
5

16. A magnetic disk array apparatus comprising a  
plurality of the magnetic disk apparatuses connected,  
wherein at least one inductive head according to claim  
10 1 is mounted as the write head, a width of the magnetic  
pole tip layer of said head in the air bearing surface  
is not more than  $0.5 \mu\text{m}$ , the saturation magnetic flux  
density of the magnetic layer consisting of the  
magnetic pole layer is not less than  $1.6\text{T}$ , and the  
15 coercivity of the magnetic recording media is  $317$  to  
 $634 \text{ kA/m}$  ( $4.0$  to  $8.0 \text{ kOe}$ ).